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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,675	12/13/2000	David J. Roach	MLD-035	2119

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EXAMINER	
QUAN, ELIZABETH S	

ART UNIT	PAPER NUMBER
1743	8

DATE MAILED: 11/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/737,675	ROACH ET AL.	
	Examiner	Art Unit	
	Elizabeth Quan	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *34-40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-40* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 December 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2 papers*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-33 in Paper No. 9 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the robotic stage, alignment pins, adjustable stop, and electronic control unit must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

4. Claims 1-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claims 1 and 33 are rendered indefinite since the tube-in-tube assembly, which is part of the manifold, should be recited as part of the manifold.

6. Claims 1, 19, and 33 are rendered indefinite due to the lack of structural relationship. How is the manifold related to the injector? How is the vacuum source related to each of the manifold and injector?

7. Claim 33 is rendered indefinite since it is unclear how openings are opposed.

8. Claims 1-33 are rendered indefinite because the compartments of the first chamber and second chamber should be distinguished. For example, a plurality of first compartments in the first chamber and a plurality of second compartments in the second chamber.

9. Claims 8 and 14 are rendered indefinite since it unclear whether another set of openings in addition to those previously claimed are now being claimed. Suggestions include either distinguishing openings for the pressure supply tube and tube-in-tube assembly by a plurality of first openings and a plurality of second openings, for example, by reciting "said plurality of openings include openings on a lower surface of said compartments receiving..."

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1-4, 19-27, 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,635,665 to Namba et al. in view of U.S. Patent No. 5,948,359 to Kalra et al.

Namba et al. disclose a washing apparatus (1) with a manifold having a tube-in-tube assembly (2), which has a plurality of pressure tubes (4) and plurality of vacuum tubes (5) in which each pressure tube is within each vacuum tube (figs. 1-12; col. 3, lines 25-34). The tube-in-tube assembly has an upper and lower end (fig. 1). The manifold has an upper first chamber (12) for providing pressurized solutions from a container (21) to the substrate and lower second chamber (13) for vacuuming solution from the substrate with a vacuum source (28) (figs. 1-12; col. 3, lines 38-49). The upper first chamber comprises a compartment having at least one opening (figs. 1-12). A pressure supply tube (14), which is connected to the container of solution, is inserted into one of the openings of the compartment of the upper first chamber (fig. 1). The compartment of the upper first chamber includes a plurality of openings on a lower surface of the compartment, which receives the tube-in-tube assembly (fig. 1). The plurality of pressure tubes of the tube-in-tube assembly is inserted into the plurality of openings on the lower

surface of the compartment of the upper first chamber (fig. 1). The lower second chamber has a compartment having at least one opening (fig. 1). A vacuum supply tube, which is connected to the vacuum source (28), is inserted into one of the openings of the compartment of the lower second chamber (fig. 1). The compartment of the lower second chamber includes a plurality of openings on a lower surface of the compartment, which receives the tube-in-tube assembly (fig. 1). The plurality of vacuum tubes of the tube-in-tube assembly is inserted into the lower surface openings of the lower second chamber, and the pressure tubes are present in the lower surface openings of the upper first chamber and lower second chamber (fig. 1). The openings on the lower surface of the compartment of the lower second chamber are larger than the openings on the lower surface of the upper first chamber (fig. 1). One would expect that the tube-in-tube assembly allows for simultaneous suction and distribution of fluid to and from the manifold and substrate by a switch of the pumps and valves (fig. 1). It is noted that the analytical substrate has not been positively recited in the body of the claim, such that the recitation of the substrate and associated elements such as microchannels, inlet port, and anode port will not be accorded patentable weight.

Namba et al. recognizes the need to wash substrates that have been used for chemical and immunological analysis (col. 1, lines 5-22). Namba et al. fail to disclose an injector included with the apparatus. However, Kalra et al. an apparatus (10) for filling and cleaning an analytical substrate (190) with microchannels (192) in which the microchannels are formed on a surface of the substrate and has an inlet port defined at an end thereof (figs. 1-8, 13-15, and 17; col. 2, line 56-col. 3, line 25; col. 5, lines 7-30). The apparatus comprises a manifold (41) for washing integrated with an injector (40) for injecting separation media, such as a reagent (fig. 10a). The

instant specification discloses that separation media that enhances separation may include solutions, gels, or polymers. One would expect that reagents would enhance separation.. The manifold is in fluid communication with the substrate (col. 10, line 21-col. 14, line 55). The manifold comprises a wash tip (41) and blow tip (42) for cleaning the substrate by distributing solution from a container to the substrate and removing the solution from the substrate. The injector is in pressure communication with the substrate for injecting the liquid media into the microchannels. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include an injector into the apparatus of Namba et al. for the disclosed advantages of having a readily programmable automated apparatus capable of performing additional and several functions in a single operation without user intervention, wasteful use of solutions, and cross-contamination as taught by Kalra et al. (col. 2, lines 5-53).

Namba et al. disclose that the washing apparatus (1) is designed to move vertically by the action of a suitable working mechanism (34). Namba et al. fail to disclose a robotic stage for moving the tube-in-tube assembly between inlet ports of the substrate. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. to provide a robotic stage for moving the tube-in-tube assembly between inlet ports of the substrate to precisely position the integral manifold and injector at its desired located as taught by Kalra et al. (fig. 3; col. 4, lines 46-52; col. 9, lines 31-49; col. 10, line 43-col. 12, line 46).

Namba et al. fail to disclose a platform with alignment pins for holding the substrate. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. to provide a platform (22) with

alignment pins (195) to secure the substrates from moving when the apparatus is operating and notifies the system that the substrate is correctly positioned and ready for analytical procedures to be performed as taught by Kalra et al. (fig. 3; col. 14, line 56-col. 15, line 10).

Namba et al. fail to disclose an arm attached to the manifold for raising and lowering the manifold away from and into contact with the substrate. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. to provide a movable arm that moves in three dimensions for raising and lower the manifold away from and into contact with the substrate as taught by Kalra et al. (fig. 3; col. 4, lines 46-52; col. 9, lines 31-49; col. 10, line 43-col. 12, line 46).

Namba et al. fail to disclose an adjustable stop for positioning the manifold. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. to provide an adjustable stop for positioning the manifold precisely and accommodating different operations as taught by Kalra et al. (fig. 9B; col. 4, lines 46-52; col. 9, lines 31-49; col. 10, line 43-col. 12, line 46).

Namba et al. fail to disclose a sensor assembly indicating when the manifold has been lowered. One would expect that the system of Kalra et al. would have a sensor assembly in order to coordinate the various operations. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. to provide a sensor assembly indicating when the manifold has been lowered as necessary to coordinate various operations as suggested by Kalra et al.

14. Claims 5-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,635,665 to Namba et al. in view of U.S. Patent No. 5,948,359 to Kalra et al. as applied to claims 1-4, 19 above, and further in view of U.S. Patent No. 5,648,266 to Astle.

Namba et al. in view of Kalra et al. do not disclose each of the chambers has a plurality of compartments and the number and spacing of the concentric tubes of the tube-in-tube assembly corresponds to the number and spacing of the inlet ports of the substrate. Astle discloses a wash manifold (16) with an upper first chamber defined in overflow manifold plate (72) and lower second chamber defined in wash manifold plate (74) (figs. 1, 2, and 4-8). The upper first chamber is divided into a plurality of compartments (R1-R8), which have at least one opening within the sidewalls of the wash manifold plate (figs. 1, 2, and 4-8). At least one pressure supply tube is connected to the container of solution and connected to the openings of the compartments of the compartments of the upper first chamber (figs. 1, 2, 4-8, and 17). One would expect that the at least one pressure supply tube is inserted into the openings of the compartments of the upper first chamber. The compartments of the upper first chamber have a plurality of openings on a lower surface of the compartments receiving a tube-in-tube assembly, such that pressure tubes (18) of the tube-in-tube assembly is inserted into the plurality of openings on the lower surface of the upper first chamber of the manifold (fig. 2). The lower second chamber of the manifold comprises 8 compartments (R1-R8), which have at least one opening within the sidewalls of the overflow manifold plate (figs. 1, 2, and 4-8). At least one vacuum supply tube is connected to the container of solution and connected to the openings of the compartments of the lower second chamber (figs. 1, 2, 4-8, and 17). One would expect that the at least one vacuum supply tube is inserted into the openings of the compartments of the

lower second chamber. The compartments of the lower second chamber have a plurality of openings on a lower surface of the compartments receiving the tube-in-tube assembly (fig. 2). The openings on the lower surface of the lower second chamber are larger than the openings on the lower surface of the upper first chamber of the manifold wherein the first chamber is above the second chamber (fig. 2). The number and spacing of the concentric tubes of the tube-in-tube assembly corresponds to the number and spacing of the inlet ports of the substrate (fig. 1; col. 1, lines 41-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. in view of Kalra et al. to provide each of upper first and lower second chambers with a plurality of compartments and number and spacing of the concentric tubes of the tube-in-tube assembly corresponding to the number and spacing of the inlet ports of the substrate for a flexibly controlled and automated system affording sequencing of any number of rows at a time useful for conducting different assays in different rows simultaneously with other rows and adapting to the conventions of the art such that commercially available ancillary equipment may be used in conjunction with the apparatus as taught by Astle (col. 1, lines 41-51; col. 2, lines 41-47; col. 4, lines 35-64).

15. Claims 1-4,19-27, 29, 31, 32 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,948,359 to Kalra et al. alternatively in view of U.S. Patent No. 4,635,665 to Namba et al.

Kalra et al. an apparatus (10) for filling and cleaning an analytical substrate (190) with microchannels (192) in which the microchannels are formed on a surface of the substrate and has an inlet port defined at an end thereof (figs. 1-8, 13-15, and 17; col. 2, line 56-col. 3, line 25; col. 5, lines 7-30). The apparatus comprises a manifold (41) for washing integrated with an injector

(40) for injecting separation media, such as a reagent (fig. 10a). The instant specification discloses that separation media that enhances separation may include solutions, gels, or polymers. One would expect that reagents would enhance separation. The manifold is in fluid communication with the substrate (col. 10, line 21-col. 14, line 55). The manifold comprises a wash tip (41) and blow tip (42) for cleaning the substrate by distributing solution from a container to the substrate and removing the solution from the substrate. The injector is in pressure communication with the substrate for injecting the liquid media into the microchannels.

A robotic stage moves the tube-in-tube assembly between inlet ports of the substrate (fig. 3; col. 4, lines 46-52; col. 9, lines 31-49; col. 10, line 43-col. 12, line 46). A platform has alignment pins for holding the substrate (fig. 3; col. 14, line 56-col. 15, line 10). An arm is attached to the manifold for raising and lowering the manifold away from and into contact with the substrate (fig. 3; col. 4, lines 46-52; col. 9, lines 31-49; col. 10, line 43-col. 12, line 46). There is adjustable stop for positioning the manifold (fig. 9B; col. 4, lines 46-52; col. 9, lines 31-49; col. 10, line 43-col. 12, line 46). One would expect that the system of Kalra et al. would have a sensor assembly in order to coordinate the various operations. In the event one would argue that the apparatus of Kalra et al. does not have a sensor assembly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a sensor assembly in the apparatus of Kalra et al. since it is very well known to use a sensor assembly to better coordinate the activities of a system.

It is noted that the analytical substrate has not been positively recited in the body of the claim, such that the recitation of the substrate and associated elements such as microchannels, inlet port, and anode port will not be accorded patentable weight.

Kalra et al. fail to disclose the claimed configuration of the manifold along with its tube-in-tube assembly. However, Namba et al. disclose a washing apparatus (1) with a manifold having a tube-in-tube assembly (2), which has a plurality of pressure tubes (4) and plurality of vacuum tubes (5) in which each pressure tube is within each vacuum tube (figs. 1-12; col. 3, lines 25-34). The tube-in-tube assembly has an upper and lower end (fig. 1). The manifold has an upper first chamber (12) for providing pressurized solutions from a container (21) to the substrate and lower second chamber (13) for vacuuming solution from the substrate with a

vacuum source (28) (figs. 1-12; col. 3, lines 38-49). The upper first chamber comprises a compartment having at least one opening (figs. 1-12). A pressure supply tube (14), which is connected to the container of solution, is inserted into one of the openings of the compartment of the upper first chamber (fig. 1). The compartment of the upper first chamber includes a plurality of openings on a lower surface of the compartment, which receives the tube-in-tube assembly (fig. 1). The plurality of pressure tubes of the tube-in-tube assembly is inserted into the plurality of openings on the lower surface of the compartment of the upper first chamber (fig. 1). The lower second chamber has a compartment having at least one opening (fig. 1). A vacuum supply tube, which is connected to the vacuum source (28), is inserted into one of the openings of the compartment of the lower second chamber (fig. 1). The compartment of the lower second chamber includes a plurality of openings on a lower surface of the compartment, which receives the tube-in-tube assembly (fig. 1). The plurality of vacuum tubes of the tube-in-tube assembly is inserted into the lower surface openings of the lower second chamber, and the pressure tubes are present in the lower surface openings of the upper first chamber and lower second chamber (fig. 1). The openings on the lower surface of the compartment of the lower second chamber are larger than the openings on the lower surface of the upper first chamber (fig. 1). One would expect that the tube-in-tube assembly would allow simultaneous suction and distribution of fluid to and from the manifold and substrate by a switch of the pumps and valves (fig. 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Kalra et al. to incorporate the claimed configuration of the manifold along with its tube-in-tube assembly for ease of manufacture and capability of inserting tubes in corresponding wells correctly and rapidly as taught by Namba et al. (col. 2, lines 3-12).

16. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,948,359 to Kalra et al. alternatively in view of U.S. Patent No. 4,635,665 to Namba et al. as applied to claim 19 above, and further in view of U.S. Patent No. 6,207,031 to Adourian et al. or U.S. Patent No. 6,199,435 to Wilmer et al.

Kalra et al. in view of Namba et al. fail to disclose a spring-loaded injector tip. However it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Kalra et al. in view of Namba et al. to use spring-loaded tips since it is very well known that the spring allows movement of the tip as taught by both Adourian et al. and Wilmer et al. (Adourian et al.: col. 19, lines 26-28; Wilmer et al.: col. 4, lines 40-42; col. 6, lines 42-46).

17. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,635,665 to Namba et al. in view of U.S. Patent No. 5,948,359 to Kalra and U.S. Patent No. 5,648,266 to Astle.

Namba et al. disclose a washing apparatus (1) with a manifold having a tube-in-tube assembly (2), which has a plurality of pressure tubes (4) and plurality of vacuum tubes (5) in which each pressure tube is within each vacuum tube (figs. 1-12; col. 3, lines 25-34). The tube-in-tube assembly has an upper and lower end (fig. 1). The manifold has an upper first chamber (12) for providing pressurized solutions from a container (21) to the substrate and lower second chamber (13) for vacuuming solution from the substrate with a vacuum source (28) (figs. 1-12; col. 3, lines 38-49). The upper first chamber comprises a compartment having at least one opening (figs. 1-12). A pressure supply tube (14), which is connected to the container of solution, is inserted into one of the openings of the compartment of the upper first chamber (fig.

1). The compartment of the upper first chamber includes a plurality of openings on a lower surface of the compartment, which receives the tube-in-tube assembly (fig. 1). The plurality of pressure tubes of the tube-in-tube assembly is inserted into the plurality of openings on the lower surface of the compartment of the upper first chamber (fig. 1). The lower second chamber has a compartment having at least one opening (fig. 1). A vacuum supply tube, which is connected to the vacuum source (28), is inserted into one of the openings of the compartment of the lower second chamber (fig. 1). The compartment of the lower second chamber includes a plurality of openings on a lower surface of the compartment, which receives the tube-in-tube assembly (fig. 1). The plurality of vacuum tubes of the tube-in-tube assembly is inserted into the lower surface openings of the lower second chamber, and the pressure tubes are present in the lower surface openings of the upper first chamber and lower second chamber (fig. 1). The openings on the lower surface of the compartment of the lower second chamber are larger than the openings on the lower surface of the upper first chamber (fig. 1). One would expect that the tube-in-tube assembly allows for simultaneous suction and distribution of fluid to and from the manifold and substrate by a switch of the pumps and valves (fig. 1). It is noted that the analytical substrate has not been positively recited in the body of the claim, such that the recitation of the substrate and associated elements such as microchannels, inlet port, and anode port will not be accorded patentable weight.

Namba et al. recognizes the need to wash substrates that have been used for chemical and immunological analysis (col. 1, lines 5-22). Namba et al. fail to disclose an injector included with the apparatus. However, Kalra et al. an apparatus (10) for filling and cleaning an analytical substrate (190) with microchannels (192) in which the microchannels are formed on a surface of

the substrate and has an inlet port defined at an end thereof (figs. 1-8, 13-15, and 17; col. 2, line 56-col. 3, line 25; col. 5, lines 7-30). The apparatus comprises a manifold (41) for washing integrated with an injector (40) for injecting separation media, such as a reagent (fig. 10a). The instant specification discloses that separation media that enhances separation may include solutions, gels, or polymers. One would expect that reagents would enhance separation. The manifold is in fluid communication with the substrate (col. 10, line 21-col. 14, line 55). The manifold comprises a wash tip (41) and blow tip (42) for cleaning the substrate by distributing solution from a container to the substrate and removing the solution from the substrate. The injector is in pressure communication with the substrate for injecting the liquid media into the microchannels. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include an injector into the apparatus of Namba et al. for the disclosed advantages of having a readily programmable automated apparatus capable of performing additional and several functions in a single operation without user intervention, wasteful use of solutions, and cross-contamination as taught by Kalra et al. (col. 2, lines 5-53).

Namba et al. in view of Kalra et al. do not disclose each of the chambers has a plurality of compartments and the number and spacing of the concentric tubes of the tube-in-tube assembly corresponds to the number and spacing of the inlet ports of the substrate. Astle discloses a wash manifold (16) with an upper first chamber defined in overflow manifold plate (72) and lower second chamber defined in wash manifold plate (74) (figs. 1, 2, and 4-8). The upper first chamber is divided into a plurality of compartments (R1-R8), which have at least one opening within the sidewalls of the wash manifold plate (figs. 1, 2, and 4-8). At least one pressure supply tube is connected to the container of solution and connected to the openings of

the compartments of the compartments of the upper first chamber (figs. 1, 2, 4-8, and 17). One would expect that the at least one pressure supply tube is inserted into the openings of the compartments of the upper first chamber. The compartments of the upper first chamber have a plurality of openings on a lower surface of the compartments receiving a tube-in-tube assembly, such that pressure tubes (18) of the tube-in-tube assembly is inserted into the plurality of openings on the lower surface of the upper first chamber of the manifold (fig. 2). The lower second chamber of the manifold comprises 8 compartments (R1-R8), which have at least one opening within the sidewalls of the overflow manifold plate (figs. 1, 2, and 4-8). At least one vacuum supply tube is connected to the container of solution and connected to the openings of the compartments of the lower second chamber (figs. 1, 2, 4-8, and 17). One would expect that the at least one vacuum supply tube is inserted into the openings of the compartments of the lower second chamber. The compartments of the lower second chamber have a plurality of openings on a lower surface of the compartments receiving the tube-in-tube assembly (fig. 2). The openings on the lower surface of the lower second chamber are larger than the openings on the lower surface of the upper first chamber of the manifold wherein the first chamber is above the second chamber (fig. 2). The number and spacing of the concentric tubes of the tube-in-tube assembly corresponds to the number and spacing of the inlet ports of the substrate (fig. 1; col. 1, lines 41-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Namba et al. in view of Kalra et al. to provide each of upper first and lower second chambers with a plurality of compartments and number and spacing of the concentric tubes of the tube-in-tube assembly corresponding to the number and spacing of the inlet ports of the substrate for a flexibly controlled and automated

system affording sequencing of any number of rows at a time useful for conducting different assays in different rows simultaneously with other rows and adapting to the conventions of the art such that commercially available ancillary equipment may be used in conjunction with the apparatus as taught by Astle (col. 1, lines 41-51; col. 2, lines 41-47; col. 4, lines 35-64).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Quan whose telephone number is (703) 305-1947. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (703) 308-4037. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9310.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Elizabeth Quan
Examiner
Art Unit 1743

eq

Jill Warden
Supervisory Patent Examiner
Technology Center 1700